Artificial photosynthesis for future energy producion

February 21 2005

Nature utilizes energy from the sun for its production. Some algae produce hydrogen from water with the help of solar energy. So why not imitate nature to extract renewable energy without harming the environment? The EU is now giving European research a boost by allocating €1.8 million to a new network to be led by Uppsala University.

Plant photosynthesis has long been studied with an eye to understanding its underlying mechanisms and then applying this knowledge to the production of energy for the needs of society. Today, hydrogen is regarded as one of the most promising forms of fuel for the future. A new European network, SOLAR-H, has now been established to bring together research competence from different fields.

“The network consists of laboratories that lead the world in a broad spectrum of fields from molecular biology, biochemistry, and synthetic chemistry to physical chemistry,” says Professor Stenbjörn Styring at the Section for Biomimetics at Uppsala University.

He recently moved to Uppsala from Lund University, together with his research team, and he will now be coordinating the new network, which was initiated in Sweden and the Consortium for Artificial Photosynthesis. With the move to Uppsala the Consortium will now be able to gather most of its research at one university, having previously been split up at three different ones. Uppsala already had Leif Hammarström’s team in chemical physics and Peter Lindblad’s group in

physiological botany. A further team has now been assembled around synthetic chemists that recently came to Uppsala from Stockholm University in connection with Styring's move.

"We now have about 40 individuals gathered at Uppsala and are full of enthusiasm about the future," he adds.

With its breadth, the Uppsala team will be able to apply many different approaches simultaneously. Lindblad's team is studying living cyanobacteria (a kind of alga) and is altering their metabolism at the genetic level so they produce hydrogen without absorbing it at the same time. Styring heads a team that is studying the mechanisms of natural photosynthesis at the biochemical level, while a third team led by a group of young scientists are busy synthesizing the molecule complexes necessary to imitate the natural process. In Leif Hammarström's team the rapid and complex reactions can be studied using a series of different physical methods of measurement.

"We think artificial photosynthesis has tremendous potential, even though it remains to be demonstrated. It's a scientific challenge, and if we succeed, the market will be gigantic."

Other laboratories in SOLAR-H are in France, Germany, Hungary, the Netherlands, and Switzerland.